

overtook them. It may, therefore, I think, be assumed that the lake has never in recent times been so extensive as it is now, but that formerly it was much more so.

It will naturally be asked, What are the causes of its recent rapid growth, and what is likely to be the end of it? Without doubt the chief cause lies in the killing of the trees, which, until lately, covered almost uninterruptedly the whole basin except the lowest portion. The water is thus drained rapidly into the lake, and the surface exposed to evaporation reduced to a minimum. The trees have been destroyed chiefly by the squatter, in order to let in the sun and improve the grass. But another and unexplained cause has been at work during recent years destroying the bush, and the trees have died away mysteriously at the rate of scores, if not hundreds, of acres annually. Grab at the roots or within the bark, the injury done by cattle and sheep, opossums destroying persistently the young shoots, and various other pests, have been set down as the cause, but no explanation has as yet been accepted as satisfactory. It would seem rather as if the trees were suffering from some sickness such as animals are subject to, and many square miles of bush may be cleared away before the disease has spent itself.

Whatever may be the cause, the trees are rapidly disappearing within the drainage area of the lake, and the result will be that with improved drainage and less absorption the lake *must* increase in extent during the next few years, provided the rainfall does not seriously diminish during the same period. Another cause which has probably been at work enlarging the lake during the last twenty-four years, is an increased rainfall, but the argument on this point is rather drawn from the rapid growth of the lake than from any accurate observation. It has certainly happened once or twice during dry seasons that the lake has fallen a foot or two, but it has always recovered and advanced during the following year, so that its growth may be considered to have been continuous since the year 1852. After the winter of 1874, the lake rose from four to five feet, and during the severe drought of the following summer sank to the extent of from one to two feet, but with the returning rains it recovered its former level. If, up to the present time, the first and wet half of a cycle has been operating, and twenty-five years of deficient rainfall were now to commence, it would still, I think, be unreasonable to expect that the lake would contract very much—say to one-half or one-quarter its present size. The water that falls at the most distant spot in the basin is carried within a few hours into the lake—in the same manner as in other parts of the country it is carried into the rivers; and the same cause which tends to make the floods of the Hunter and other rivers more violent every year, will prevent Lake George from ever again becoming an insignificant pool. It may be noticed that cloudy summers—not necessarily rainy ones—would have a considerable effect in diminishing evaporation and thereby preventing shrinkage. A prevalence of westerly or northerly winds would have an opposite effect.

Near one of the squatter's houses, long ago submerged, was a well-stocked fish-pond. This the advancing waters soon appropriated, and its occupants finding their way into the lake, have increased to such an extent that the lake itself is now well stocked. These fish were chiefly the freshwater cod of Australian streams, and some of them have thriven so well that it is by no means rare to meet with specimens weighing from thirty to forty pounds each. Black swans, large flocks of three or four different kinds of ducks, with the red-legged ibis and other birds frequent the shores and afford good sport.

The general appearance of the lake shore is somewhat desolate on account of the enormous number of partially submerged trees that stand, some of them a mile or more, out in the water, and give the lake the appearance of an American river during a flood. The Eastern shore, however, is very beautiful for Australian scenery, the hills dotted with clumps of dark casuarina rising in beautiful grassy slopes from the water's edge.

At a few miles distance from Lake George to the eastward is Lake Bathurst, a much smaller sheet of water that appears to be under very much the same influences as the larger lake, the encroachment of the water being as well marked, although not so extensive.

It would be interesting to know all the influences at work in the increase of the Great Salt Lake, Utah, which is said to be growing at the rate of ten inches in vertical height yearly. As the whole country in the neighbourhood of this lake is destitute of trees, a periodic increase of rainfall is most probably the chief cause, in which case the lake's maximum may be expected to be reached at any time.

The cultivation of land previously bare might naturally be expected to cause a greater retention of moisture, whilst at the same time the hardening of the surface by the treading of cattle and sheep would cause the water to run off more easily; but the area of cultivated or pastured land within the drainage basin compared with that left in its primitive condition, is unknown, and it would be impossible to differentiate their effects.

It will be a subject of considerable interest to watch the conduct of these lakes during the next twenty years. R. ABBAY

The Cruise of the *Argo*

MANY useful suggestions were forwarded to me by the readers of NATURE before the yacht left Liverpool, in return for which I send my best thanks and a list of the places we have visited in the course of our most delightful and, as I trust, not unsuccessful voyage: Jan. 24, Madeira; Feb. 7, Antigua; Feb. 12, Barbuda; Feb. 13, St. Kitts; Feb. 14, Guadeloupe; Feb. 13, Dominica; Feb. 17, Martinique; Feb. 18, St. Vincent; Feb. 20, Grenada; Feb. 22, Trinidad; March 9, La Guayra; March 10, Caracas; March 17, Valentia; March 18, Puerto Caballo; March 21, Tucacas; March 27, Santa Marta; March 29, Savanna; March 31, Cartagena; April 2, Kingston, Jamaica; April 13, Havanna (Museum most creditable). We leave tomorrow for Vera Cruz and the city of Mexico, with the Bahamas, Philadelphia, New York, and Niagara in prospect. We have had a clean bill of health and favourable weather throughout. One of the chief objects proposed by Mr. Cholmondeley in undertaking the voyage was to observe the habits of tropical birds in the west, and to increase his fine collection in the aviaries at Condover. Amongst the very numerous specimens of birds now on board are some that are extremely fine, and such as have rarely been brought to England in a living state.

In marine collecting most has been done in sponges, tunicates, and echinoderms. These, which have been gathered amply and in the rough, will no doubt on examination yield some good microscopic forms, and perhaps a few polypozoa, of which there has been to me, a most deplorable scarcity. In botanising, very fair success has been met with in Mosses, Lichens, and Jungermannia. A few most interesting fungi were collected in the deep forest in Trinidad. Entomology has not been neglected, but the extreme dryness of the season has been unfavourable. Of the eminent men, true students of nature, it has been my good fortune to meet, I must not now attempt to mention even the names. My great obligations to them will I trust find a suitable opportunity for acknowledgment. HENRY H. HIGGINS

Havana, April 10

Recent Discoveries in New Guinea; and Papua or Papooa?

THE ascent for ninety miles of a fine river in the south-east portion of New Guinea, in September last, by the mission vessel *Ellengowan*, has doubtless, before now, been made known in England (NATURE, vol. xiii. p. 76).

I expect, during the present year, to leave Samoa on my return to England, and I have some hope that I may take New Guinea *en route* to Australia, and visit the mission stations of the London Missionary Society on the south-east coast. If this hope is realised, I shall use every available means to determine what this large quadruped is, which has been tracked in three different parts of the island, if no one else makes the discovery before then.¹

In concluding this letter, I wish to enter a protest against Dr. A. B. Meyer's orthography of the Malay names of New Guinea and the frizzly-haired portion of its inhabitants. He says (NATURE, vol. ix. p. 77, note): "I write Papooas, and not Papuas, because the Malays pronounce the word Papooa and not Papua." Surely Dr. Meyer must be aware that the vowel *u* in Malay is pronounced like *oo* in English. As early as 1812 Marsden, in his Malay Grammar (p. 12), gives as examples of the sound of *u* the "English *oo* in loom and tool." It appears to me not only pedantic and unnecessary, but also very objectionable, to make a change at the present time. Perhaps I feel more keenly on this point than most persons, owing to the fact that, with the assistance of a large staff of co-workers in various parts of the Pacific, I have in progress a comparative grammar

¹ It has been recently announced in the *Sydney Herald* that Signor D'Albertis has identified the large bird with the red-necked hornbill, and the droppings as those of the cassowary.—ED.

and dictionary of all the principal Malayo-Polynesian dialects, and am trying to reduce the whole to a uniform system of orthography.

S. J. WHITMEE

Samoa, Jan. 3

The Visible Horizon

A POINT of some scientific interest has just been argued in the High Court of Justice. It was contended by the Solicitor-General that the three miles' limit of territorial waters was of modern origin, and by Sir R. Phillimore that it was due to that being the distance a cannon ball would reach from the shore. There can, however, be no doubt that the limit was recognised long before the invention of gunpowder.

Three miles is the distance of the *offing* or visible horizon to a person six feet in height standing on the shore. It is natural to suppose that the early maritime peoples of Europe would lay claim to the sea as far as the eye could reach. This distance they would find by experience was just *three miles*, and it can be proved mathematically to be correct. Measured by this standard—a tall man, usually taken as six feet high—the distance is invariable for all time, places, and peoples; measured by a cannon ball, it is constantly varying, and now ought to be five miles rather than three. The fact that the distance depends on both ocular and mathematical demonstration, and is not subject to improvement in gunnery, is the best explanation of its origin and application.

B. G. JENKINS

Dulwich, May 8

Lunar Maps

LOHRMAN's complete map, three feet in diameter, four sections of which were published in 1824, has been recently engraved by J. A. Barth, of Leipzig, under the supervision of Dr. Schmidt, director of the Athens Observatory, who has contributed a descriptive letterpress.

Schmidt's own map of six French feet diameter, will be issued before the end of the present year, from the *atelier* of the Royal Prussian Staff, the Prussian Government having, with great credit to itself, purchased that incomparable work. It is the result of thirty-four years' labour, and contains about 34,000 craters and an equal number of hills, besides over 350 rills and other objects. The difficulty of noting and correctly mapping this amazing number of lunar formations will be understood by anyone at all acquainted with the subject; and it will be seen that Dr. Schmidt has completed an achievement not surpassed in scientific capability and perseverance. A written text will accompany the map.

It were to be wished that our own countryman, Mr. Birt, could look forward to a similar recognition of his services. His great lunar map, of which we have heard nothing for some time, is on a plan quite different from Schmidt's, to which it would be found, if completed, an invaluable accompaniment by observers of the lunar surface; and it will speak but little for the scientific taste of our country if Mr. Birt's work is allowed finally to collapse for want of appreciation and encouragement.

Millbrook, Tuam, Ireland

J. BIRMINGHAM

OUR ASTRONOMICAL COLUMN

THE STAR-LALANDE 27095 (BOOTES).—Olbers, writing to Bode in July, 1804, respecting his observations of the comet of that year, remarks of Lalande 27095, near the place of which star the comet was situated on March 22: "Ist nicht mehr am Himmel zu finden." It was observed by Lalande as a seventh magnitude, 1795, May 25 ("Histoire Céleste," p. 164), centre wire at 14h. 42m. 10s.

The star was observed by Bessel, 1828, May 24, as a 9th magnitude, and is No. 976 of Hour xiv. in Weise's second catalogue. In the "Durchmusterung" it is 9°. There is evidently reason for supposing the star to be variable.

It follows the sixth-magnitude-star B.A.C. 4906, 19s., and is 6° 37' north of it, the position for the beginning of the present year being R.A. 14h. 45m. 56s., N.P.D. 52° 6' 5".

THE FIRST COMET OF 1743.—Notwithstanding the very marked deviation of the orbit of this comet from a parabola, it does not appear that any attempt has yet been made to determine, directly from the observations,

the true form of the orbit, or at any rate to work out elements which will satisfy the observations within their probable limits of error. It is true that these observations, with one or two exceptions, are by no means exact, and Olbers, who examined the question in 1823, was of opinion that, from their general uncertainty, an investigation into the nature of the conic section described was hardly worth the trouble it would involve. Notwithstanding this expression of opinion from so high an authority, it may be remarked that there are a sufficient number of observations in our possession which cannot fairly be supposed liable to serious errors to justify an attempt to deduce more satisfactory elements than those hitherto calculated.

The comet appears to have been first observed by Grischow or Griso, at Berlin, on February 10, and his observation on the evening of that day was considered by Olbers to be the most certain of any he made upon this comet, and not liable to a greater error than 2' or 3'. On February 14, 15, 16 and 19, Grischow, observing apparently with Margareta Kirch, also gives particulars from which probably fair positions might be deduced. And we have an observation by Father Frantz, of Vienna, on February 21, given in proper form in the "Philosophical Transactions" of the Royal Society. Also a good observation by Maraldi at Paris on February 13, and one by Cassini on February 17, which last, however, is open to some doubt, not only for a reason pointed out by Olbers, but from an error as to the comparison star. Zanotti's observations at Bologna, form the longest series, and extend from February 12 to 28, but they are only published (in *Mémoires de l'Academie*, 1743) in longitude and latitude to minutes of arc, without further detail, and were not given by Zanotti as having any pretensions to accuracy. The parabolic orbit with which Olbers was content to discontinue his computations was the following:—

Perihelion Passage, 1743, Jan. 10, at 20h. 29m. 37s. Paris M.T.

| | |
|-------------------------------------|-------------|
| Longitude of perihelion | 92° 57' 51" |
| ,"" ascending node | 67° 31' 57" |
| Inclination to ecliptic | 2° 16' 16" |

Perihelion distance 0.83818 { (Earth's mean distance = 1)

These elements agree well, according to Olbers, with the positions observed on Feb. 10 and 28, and with the longitudes on Feb. 13 and 21, but the latitudes on these days differ by 14' and 10' respectively, which is precisely the kind of discordance, which we might expect to find, if the true orbit of the comet were an ellipse of short period. It will be remembered that Clausen considered this comet identical with that of November 1819, detected by Blanpain at Marseilles, with a period of 6.73 years before 1758 and 5.60 years after 1817, and that at the suggestion of Olbers the perturbations were calculated at the Collegio Romano to the year 1836, when the comet had been expected to reappear. The orbit of short period which appears in catalogues with Clausen's name, was calculated from Zanotti's observations of Feb. 12, 20, and 28, with a pre-supposition as to the length of the major-axis. As already remarked, no attempt, so far as we know, has yet been made to deduce elements direct from the observations, which shall represent them with smaller errors than the parabolic orbits of Lacaille, Olbers, and Struyck.

Grischow records that on the evening of Feb. 11, 1743, the apparent diameter of the comet was 18', that it appeared like a greyish-white cloud, but with close attention, "ein kleines helles Pünktlein in der Mitte gewahr." We find by calculation that the comet at this time was distant from the earth only 0.051 of the earth's mean distance from the sun, and are reminded that such an object would have afforded an opportunity of the kind to which Mr. Marth has lately adverted, for a determination of the amount of solar parallax. A similar opportunity